

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

BECKMAN COULTER, INC.,

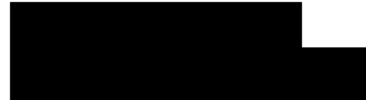
Plaintiff,

v.

CYTEK BIOSCIENCES, INC.,

Defendant.

C. A. No. 24-945-CFC-EGT



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**CYTEK'S SUPPLEMENTAL
CLAIM CONSTRUCTION BRIEF**

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91	Beckman Coulter's February 14, 2025 Initial Infringement Contentions, Exhibit 1 (Claim Chart for the '582 Patent)
92	Beckman Coulter's February 14, 2025 Initial Infringement Contentions, Exhibit 2 (Claim Chart for the '443 Patent)
93	Beckman Coulter's February 14, 2025 Initial Infringement Contentions, Exhibit 3 (Claim Chart for the '106 Patent)
94	Beckman Coulter's February 14, 2025 Initial Infringement Contentions, Exhibit 4 (Claim Chart for the '107 Patent)

Consistent with the Court’s order at the August 25, 2025 *Markman* hearing, Cytek respectfully provides supplemental briefing on additional “first” / “second” terms, and corresponding structure (to the extent present) for the means-plus-function terms “optical element,” “collimating optical element,” “collecting optical element,” and “focusing optical element.”

I. “FIRST” / “SECOND” TERMS¹

The Court adopted Cytek’s construction for “first” and “second” with respect to the “filter” terms. (*Markman* Hr’g Tr. 74:1-18.) The patents’ shared specification, as well as the claim language, confirms that “first” and “second” also impart positional significance with respect to the claim terms “image”; “semiconductor detector”; “focusing optical element”; and “curved mirror.”

A. “[first / second] image” (’582, cls. 1, 14, 15, 20, 21)

The “first” and “second” modifiers to the claimed “image” impart positional significance. The ’582 specification indicates with respect to FIG. 25 that a

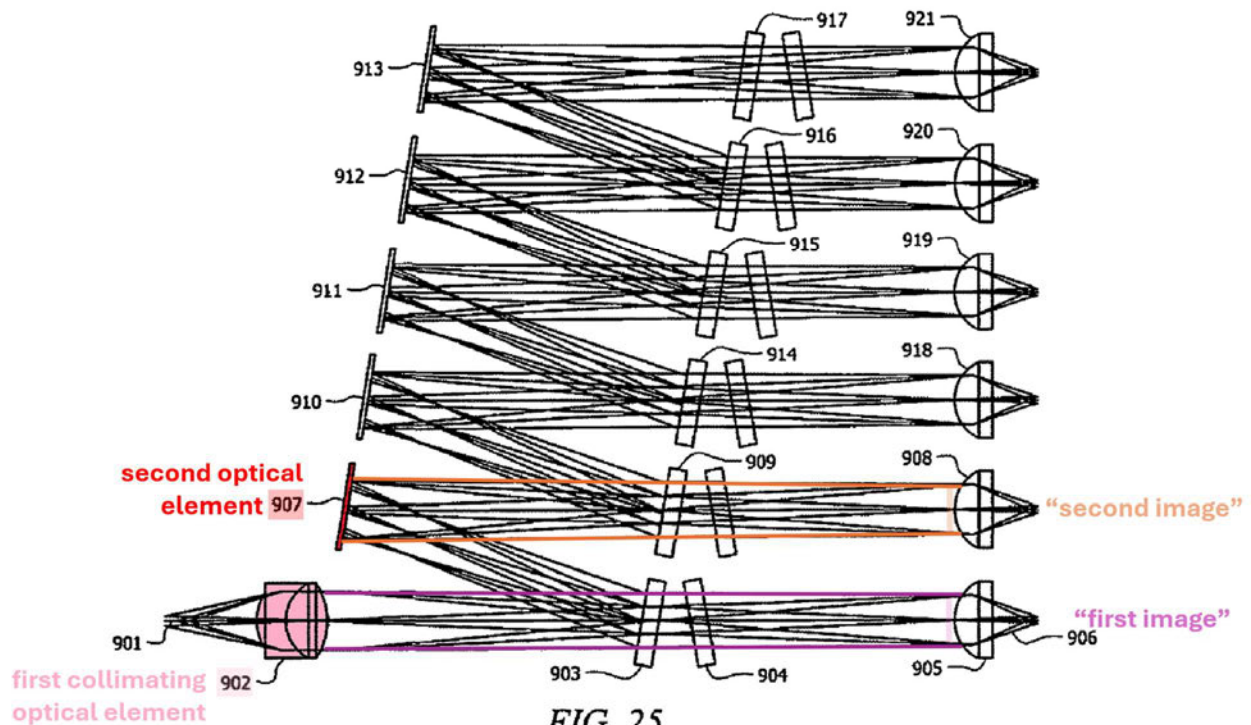
¹ Cytek also provides a copy of BEC’s February 14, 2025 Initial Infringement Contention charts as discussed with the Court at the August 25, 2025 *Markman* Hearing. (See Exs. 91-94.) At the hearing, Cytek directed the Court to BEC’s infringement contentions for claim 10 of the ’443 Patent that demonstrated that, contrary to BEC’s briefing, BEC alleged for “initial filter” that “any of the filters in a coarse wavelength division multiplexer is a ‘first filter,’ including filters which are not immediately subsequent to the ‘collimation lens’ along the optical path.” (See Ex. 92, at 204-14.) Although BEC attempted to point to claim 9 at the hearing, its allegations for claim 9 also state that “[a]ny of the filters in a coarse wavelength division multiplexer is a ‘first filter.’” (*Id.*, at 203.)

“collimating optical element, ... may capture the light from source **901**, and project a magnified image of the object” near a focusing lens **905**. (’582, 44:58-61.) This image is later classified as a “first image” when contrasted against a “second image.” That is, the specification indicates:

element **902** and the image near focusing lens **905**. The concave mirror **907** therefore creates a second image of the collimating lens **902** near a second focusing lens **908**. The light beam between the concave mirror **907** and the second image at the lens **908** may have substantially the same diameter as the beam of light between the collimating lens **902** and the first image near the focusing lens **905**. The relay

(*Id.*, 45:20-26 (highlighting added).)

The following annotation of Figure 25 reflects all this:



(’582, FIG. 25 (annotated).) The “first image” is projected from the sequential first (collimating) optical element in the optical path and is created “near the focusing lens **905**,” focusing lens **905** being the sequential first focusing lens in the array of focusing lenses in FIG. 25. (*Id.*, 44: 58-61, 45:25-26, 45:63.) The “second image” is “created” by a “second optical element,” concave mirror **907**, and “near a second focusing lens **908**,” which is the sequential second focusing lens in the array of focusing lenses. (*Id.*, 45:16-17, 45:20-26, 45:32-35, 45:38-43.)

These disclosures are also consistent with the parent ’412 patent’s original claims that are treated as part of the *specification*. *Crown Packaging Tech., Inc. v. Ball Metal Beverage Container Corp.*, 635 F.3d 1373, 1380 (Fed. Cir. 2011) (“Original claims are part of the specification ...”). Claim 1 recites a “collimating optical element... that projects a magnified image² of the object as a first light beam.” (Ex. 39, ’412, cl. 1.) Claim 3 later recites an “image relay optical element” that is optically disposed *after* the collimating optical element and “configured to project a second image as a second light beam[.]” (*Id.*, cl. 3.) Thus, the “first image” precedes the “second image” in the claimed WDM’s optical path.

Claims 14 and 20 of the asserted ’582 patent are consistent with the original specification’s use of “first image” and “second image.” Claim 14 recites a “collimating optical element ... configured to project a collimated beam including a

² Underlining added unless otherwise indicated.

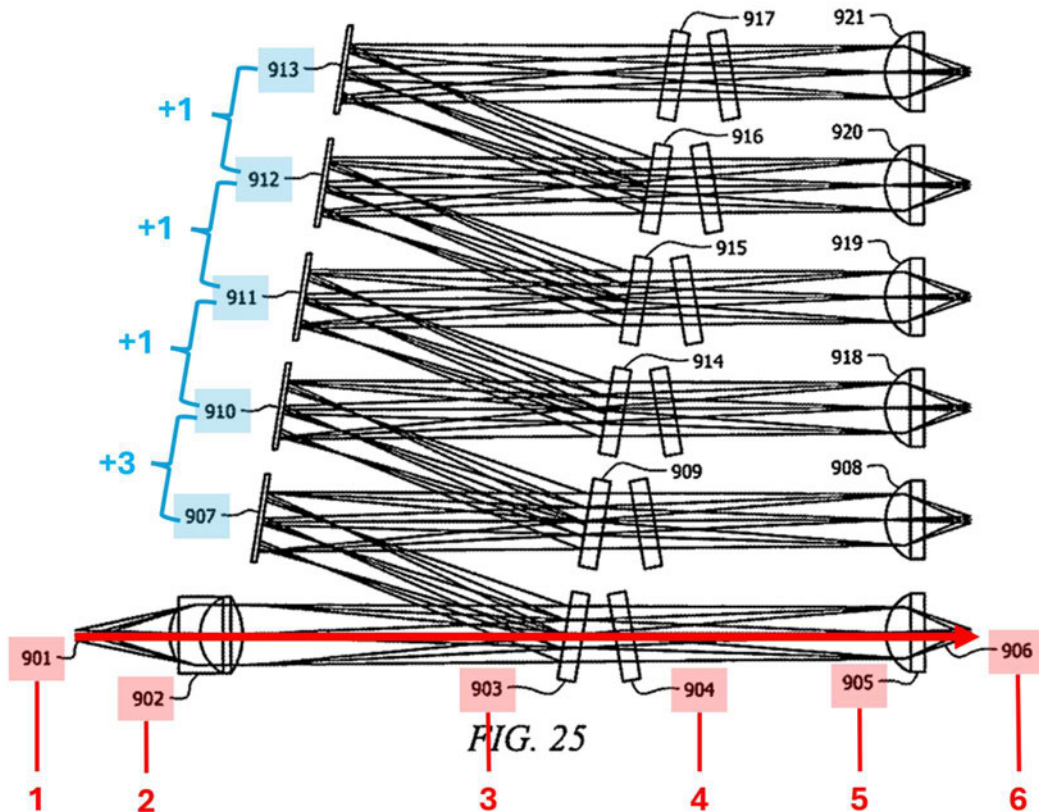
first image” that *precedes* an “optical relay element” that is “arranged to receive the collimated beam” and “produce a second image.” (’582, cl. 14.) Claim 20 also recites a “collimating optical element configured to project a first image” and an “optical relay element configured to receive light from the collimating optical element and to project a second image.” (*Id.*, cl. 20.) The language in both independent claims requires that a collimating optical element precedes an optical relay element in the optical path; the first image projected by the collimating optical element must precede the second image projected by the optical relay element.

B. “[first / second] curved mirror” (’106, cls. 1, 5)

The specifications also uses “first” and “second” to identify the positioning of “optical elements” within a WDM’s optical path. The specifications identify a “collimating optical element **902**” and a “second optical element **907**, such as a concave mirror” (*i.e.*, a type of curved mirror) that is disposed after element **902** in the WDM’s optical path. (’582, 45:8-20; *see also id.*, 45:63 (referring to “first collimating optical element”).) As the Court correctly observed, in Figure 25 “there is strong evidence that when it comes to at least one subset of a curved mirror, there ought to be a sequential or temporal limitation.” (*Markman* Hr’g Tr. 74:6-9; *see* Joint Claim Construction Br. (“Joint Br.”), 14, D.I. 114, (depicting sequentially ordered relationship of concave mirrors **907, 910, 911, 912, 913**); *see also* ’582, 45:44-49 (“As shown in FIG. 25, additional relay collimating optical elements **910**,

911, 912, 913 and dichroic filters **914, 915, 916, 917** can be cascaded in the same way to produce multiple images near focusing lenses **918, 919, 920, and 921**”).)

This use of “first” and “second” for optical elements (including concave mirrors) is more broadly confirmed in how the specification labels WDM components in FIG. 25. These components, including concave mirrors **907, 910, 911, 912, 913**, are numbered sequentially according to their position along the WDM’s optical path.



(’582, FIG. 25 (annotated).) Light originates from light source **901**, then travels to collimating optical element **902**, to project as a collimated beam onto dichroic filter **903**, where it splits and a portion of the collimated beam continues to a bandpass

filter **904** before arriving at focusing lens **905** and focusing to focal point **906**. (*Id.*, 44:35-38, 44:47-59, FIG. 25.) Another portion of the collimated beam reflects toward concave mirror **907**, which is disposed after the earlier components. (*Id.*, 44:60-61, FIG. 25.) The specification also indicates that, after concave mirror **907**, the next concave mirror is **910** a higher number than **907** and positioned further along the optical path. (*See id.*, 45:10-17, FIG. 25.) Every subsequent concave mirror increments upward by a single number (e.g., **911**, **912**, **913**) and is positioned further along the optical path than the preceding concave mirror, parallel with how “first” increments to “second” in an ordered relationship. (*Id.*)

Further, the '106 claims recite “[first / second] curved mirror” where the claim language confirms that “first” and “second” impart positional significance. Claim 1 recites a “first curved mirror” arranged to receive a portion of fluorescent light after the light passes through a collimating optical element and “reflect the portion of the fluorescent light towards the first semiconductor detector.” ('106, cl. 1.) Reflected light impinges on a first dichroic filter, where a first color band passes through the filter and a second color band is reflected away from the first semiconductor detector. (*Id.*) Claim 5 recites a “second curved mirror” that is “arranged and configured to reflect at least a portion of the fluorescent light reflected by the first dichroic filter,” indicating the second curved mirror is positioned sequentially after

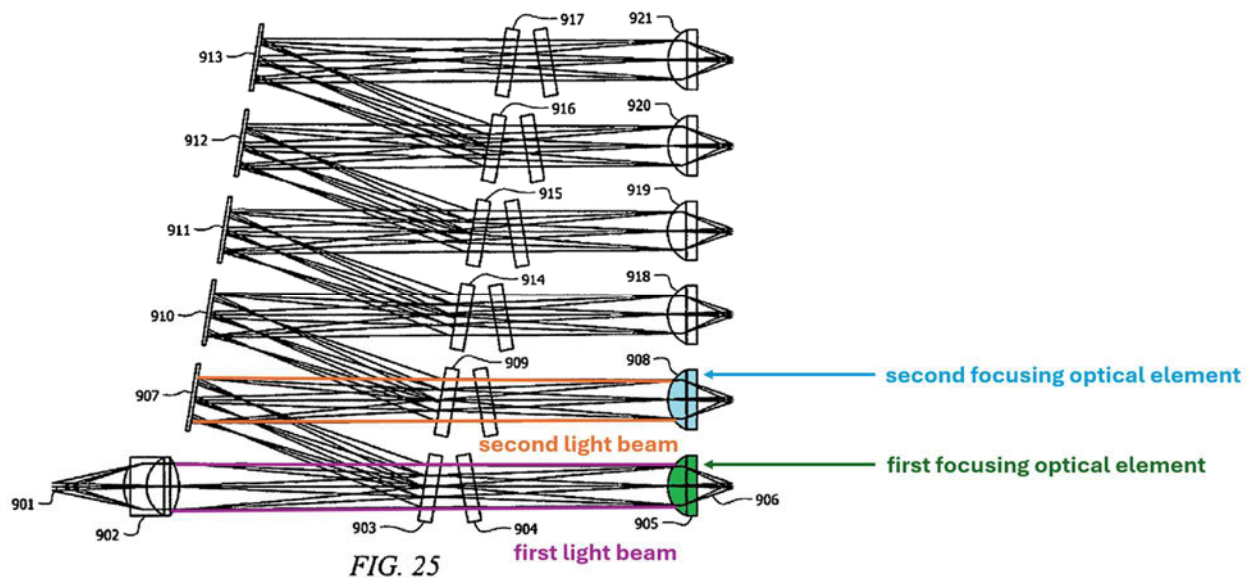
the first curved mirror. (*Id.*, cl. 5.) This ordering is consistent with the specification's use of "first" and "second."

C. "[first / second] focusing optical element" ('582, cls. 1, 3, 17, 18, 26)

Like "curved mirror," the labeling for FIG. 25's focusing lenses, part of the corresponding structure for "focusing optical element" (*see* Section II.D), indicates the use of sequential numbering to denote position along the WDM's optical path. The specification identifies focusing lenses **905**, **908**, **918**, **919**, **920**, **921** as positioned sequentially along the WDM's optical path; higher numerical labeling indicates a focusing lens is further along the optical path relative to others in the set. ('582, 44:58-66, 45:16-31, 45:44-54, FIG. 25.) The specification also expressly recites a focusing lens **905** (first in the WDM) and after that in the optical path, a "second focusing lens **908**." (*Id.*, 45:20-22 ("The concave mirror **907** therefore creates a second image of the collimating lens **902** near a second focusing lens **908**.").) Use of "first" and "second" with focusing lens tracks use of these terms with "image."

The parent '412 patent's original claims similarly treat "first" and "second" focusing optical elements as sequential within the claimed WDM's optical path. Claim 1 recites a "collimating optical element that... projects a magnified image of the object [e.g., light source] as a first light beam" and a "first focusing optical element configured to focus the first light beam." (Ex. 39, '412, cl. 1.) Claim 3

depends from claim 1 and introduces an “image relay optical element arranged to receive a color band of interest of the first light beam” and is “configured to project a second image as a second light beam.” (*Id.*, cl. 3.) Claim 6 depends from claim 3 and further recites “a second focusing optical element configured to focus the second light beam... to a second semiconductor detector.” (*Id.*, cl. 6.) These claims indicate the sequential nature of “first” and “second” for “focusing optical element”. A “first focusing optical element” focuses a “first light beam” that is optically disposed before a “second light beam” that is focused by a “second focusing optical element.”



(*Id.*, FIG. 25 (annotated).)

D. “[first / second] semiconductor detector” (’582, cls. 1, 17, 26; ’106, cls. 1, 3, 4, 5)

The labeling for FIG. 25A indicates that the specification uses sequential numbering to denote a semiconductor detector’s position, relative to other

semiconductor detectors, along the WDM's optical path. As shown below, photodetectors **940**, **941**, **942**, **942**, **943**, **944**, **945** are specifically labeled such that the first sequential photodetector is numbered **940**, the second, **941**, and so on.

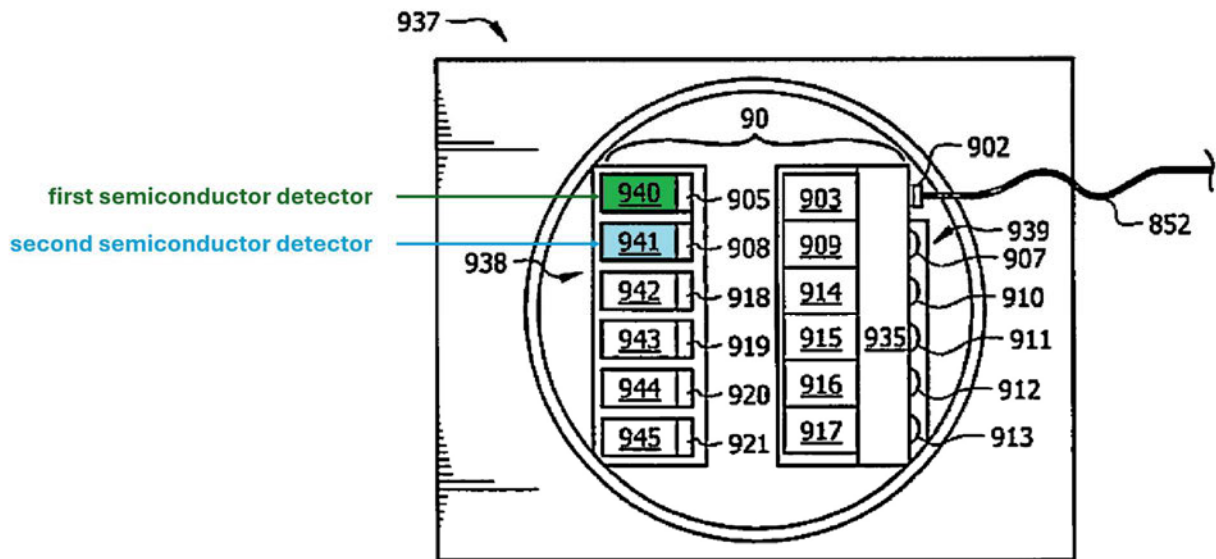


FIG. 25A

(’582, FIG. 25A (annotated); *see also id.*, 46:10-27 (dichroic filters **903**, **909**, **914**, **915**, **916** split light into “multiple colored bands with different wavelengths to be detected by photodetectors **940**, **941**, **942**, **943**, **944**, and **945**, respectively.”).) Every subsequent semiconductor detector increments upward by a single number (e.g., **941**, **942**, **942**, **943**, **944**, **945**) and is positioned further along the optical path than the preceding semiconductor detector, parallel with how “first” increments to “second” in an ordered relationship. (*Id.*) This incrementing schema is consistent with the focusing lenses **905**, **908**, **918**, **919**, **920**, **921** that are optically coupled to the detectors, such that a POSA would have expected, e.g., that “second focusing

lens **908**” would be paired with a second semiconductor detector (**941**).

The parent ’412 patent’s original claims also indicate that “first” and “second” impart positional significance for “semiconductor detector.” Claim 1 recites a “first semiconductor detector” that receives a “first light beam” projected by a collimating optical element and focused onto the detector by a first focusing optical element. (Ex. 39, ’412, cl. 1.) Claim 6 recites a “second semiconductor detector” that receives a “second light beam” projected by an image relay optical element and focused onto the detector by a second focusing optical element. (*Id.*, cls. 3, 6.) The claims’ use of “first” and “second” follows the position of these semiconductor detectors along the optical path, consistent with the detectors’ placement in the exemplary WDM shown in FIG. 25A above (and supporting written description).

Further, the ’106 claims’ use of “[first / second] semiconductor detector” is consistent with the ’412 claims and specification disclosures. Claim 1 recites a “first semiconductor detector” where the first curved mirror receives light from the collimating optical element and reflects light toward a first dichroic filter interposed between the first curved mirror and the first semiconductor detector. (’106, cl. 1.) The claim then recites that the “first dichroic filter” is (1) configured “to allow the first color band in the fluorescent light to pass through the first dichroic filter and onto the first semiconductor detector;” and (2) “reflect a second color band... away from the first semiconductor detector.” (*Id.*) Claim 4 later recites a “second

semiconductor detector” configured to detect a “second color band in the fluorescent light reflected by the first dichroic filter.” (*Id.*, cl. 4.) The claims’ description of the path of the fluorescent light confirms that a “first semiconductor detector” precedes a “second semiconductor detector” within the claimed WDM.

II. CORRESPONDING STRUCTURE FOR MEANS-PLUS-FUNCTION TERMS

The Court construed “optical element,” “collimating optical element,” “collecting optical element,” and “focusing optical element” as means-plus-function and instructed the parties to identify corresponding structure in supplemental briefing. (8/25/25 Hr’g Tr. at 191:25-192:24.) The terms “optical element” and “collimating optical element” lack adequate structure to perform their claimed functions and are indefinite. In contrast, the specifications disclose clearly linked structure for “collecting optical element” and “focusing optical element” consistent with Cytex’s proposals.

A. “optical element”

1. ’443, Claim 13

“optical element”	
Parties’ Agreed Upon Function	detect scattered light emitted by the particle in the flow channel and illuminated by a light source.
Cytex’s Proposed Structure	Indefinite. If not indefinite, then the required structure is detector 408 and detection system 413 .

Consistent with *Williamson*, the Court properly recognized that “element” in “optical element” is a nonce term subject to means-plus-function. (*Markman* Hr’g Tr. 177:21-23.) As “element” is a nonce term, the modifying prefix “optical” is insufficient structure to perform the claimed function, requiring resort to the specification. But “optical” nevertheless informs the scope of “element” and must be accounted for. But there is no corresponding “optical” structure in the specification that performs the function of “detect[ing] scattered light emitted by the particle in the flow channel and illuminated by a light source.” The term “optical element” is indefinite.

The specification confirms that no “optical element” performs the claimed detection function. It identifies numerous structures for “optical element,” all of them lenses, prisms, or mirrors. (*See, e.g.*, ’582, 4:61-62 (“the first optical element is a lens and the second element is a concave mirror”), 5:31, 6:39-46, 29:55-57, 30:44, 36:41-44; *see also* Ex. 28, Ilkov¶¶95.) None of these structures “detect scattered light,” as discussed in Cytek’s original briefing. (Joint Br. 58-59.)

The *only* potential structures that could perform the claimed function are detector **408** and detection system **413**, depicted in FIG. 38 and used to detect scattered light emitted by the particle in the flow channel and illuminated by a light source. (’582, 52:40-54:11; Ilkov¶¶97-98.) But the specification does not “clearly link” these detectors to the claimed function. Detectors are electro-optical because

they convert light into a signal, in conflict with claim 13’s structural requirement that the “element” be purely “optical.” *Med. Instrumentation & Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1219–20 (Fed. Cir. 2003) (reversing district court’s finding of corresponding structure because some structures, while disclosed in the specification, were not clearly linked to the function); *Saffran v. Johnson & Johnson*, 712 F.3d 549, 562 (Fed. Cir. 2013) (limiting the corresponding structure to one that was clearly linked to the function even though there were other disclosed structures); *see also MobileMedia Ideas LLC v. Apple Inc.*, 780 F.3d 1159, 1170 (Fed. Cir. 2015) (“[T]he fact that ‘... a function may be performed by two structures’ is ‘irrelevant in the context of a § 112, paragraph 6 analysis without a clear link ...’”) (quoting *Medtronic, Inc. v. Advanced Cardiovascular Sys., Inc.*, 248 F.3d 1303, 1313 (Fed. Cir. 2001)); *see also* Ilkov¶102. Nowhere does the specification treat detectors as optical elements.

The claims confirm the patentee understood the distinction between a “detector” and an “optical element.” Claim 13 ultimately depends from (and thus incorporates) claim 1, which expressly recites a “set of detectors.” These detectors are distinct from an “optical element.” And the patentee knew how to plainly recite a detector for scattered light instead of using nonce language like “optical element.” (*See* ’443, cl. 5 (reciting “side scatter detectors”).)

To the extent the Court disagrees, detector **408** and detection system **413** are

both required structures to perform the claimed function. Claim 13 recites that the optical element must “detect scattered light,” which comprise both forward scattered and side scattered light. Only the combination of detector **408** and detection system **413**, depicted in FIG. 38, may capture both kinds of scattered light and thus perform the claimed function. *Transcend Med., Inc. v. Glaukos Corp.*, 2015 WL 263612, at *17 (D. Del. Jan. 16, 2015) (adopting defendant’s proposed structure because that was the only structure that was “capable of performing the entire function”); *Cf. Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 296 F.3d 1106, 1119 (Fed. Cir. 2002) (“[C]orresponding structure must include all structure that actually performs the recited function.”).

2. '443, Claim 16

“optical element”	
Parties’ Agreed Upon Functions	(1) detect scattered light emitted by the particle in the flow channel and illuminated by a light source; and (2) output, based on the detected scattered light, the light to the WDM via the optical fiber.
Cytek’s Proposed Structure	Indefinite.

Here again, no adequate structure is disclosed to achieve the two claimed functions. *Williamson*, 792 F.3d at 1352. The specification only discloses that detector **408** and detection system **413**—not an “optical element”—perform the first

claimed detection function, rendering the claimed “optical element” indefinite as described above for Claim 13. In addition, the specification is silent on any structure performing the second claimed output of detection function. Detector **408** and detection system **413** cannot perform the second function to “output, based on the detected scattered light, the light to the WDM via the optical fiber.” These structures merely detect scattered light and lack functionality to output light to an optical fiber based on the detected scattered light.

3. '443, Claim 18

“optical element”	
Parties’ Competing Proposed Functions	<p>Cytek’s Proposed Functions: (1) detect scattered light emitted by the particle in the flow channel and illuminated by the one or more light sources and (2) output light to the WDM via the optical fiber.</p> <p>BEC’s Proposed Function: detect scattered light emitted by the particle in the flow channel and illuminated by one or more of the light sources</p>
Cytek’s Proposed Structure	Indefinite.

BEC’s proposed function overlooks that Claim 18 recites two functions for the claimed “optical element”: “to detect scattered light emitted by the particle in the flow channel and illuminated by the one or more light sources” and also that “each optical fiber is configured to receive light from the optical element and provide the light to a WDM of the one or more WDMs.” ('443, cl. 18.) When taking into

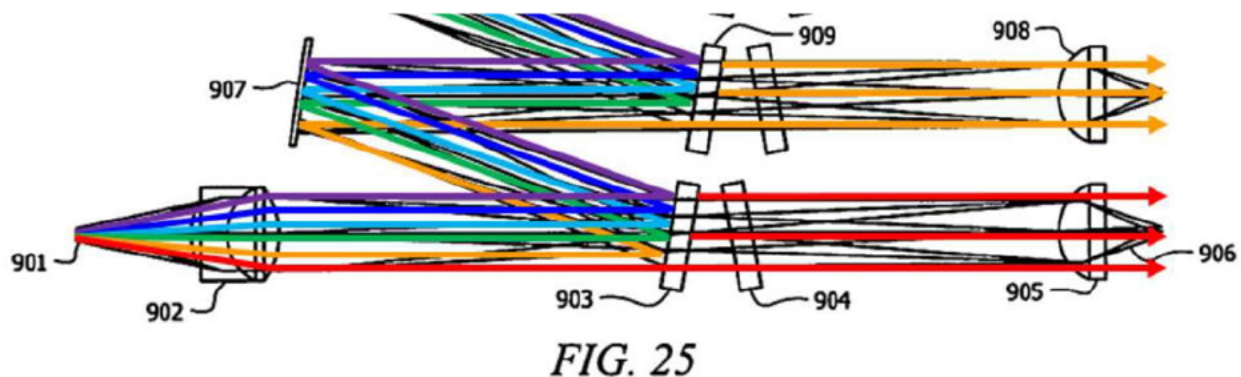
account both functions, “optical element” is indefinite for lack of corresponding structure for the reasons provided above for Claims 13 and 16.

B. “collimating optical element”

1. ’582, Claim 1

“collimating optical element”	
Parties’ Competing Proposed Functions	<p>Cytek’s Proposed Function: (1) receive light from a light source; and (2) project a “collimated beam” onto an optical relay element.</p> <p>BEC’s Proposed Function: (1) receive light from a light source; (2) project a collimated beam</p>
Cytek’s Proposed Structure	Indefinite.

Cytek’s proposed function is correct because claim 1 requires an “optical relay element arranged to receive at least a portion of the collimated beam from the collimating optical element.” The specification confirms the collimating optical element (902) must project a collimated beam onto the optical relay element (907).



(’582, FIG. 25 (annotated from Ex. 1, ¶ 27); *see also* Ilkov ¶119.)

But the specification lacks corresponding structure to perform the undisputed function of “projecting a collimated beam.” A single passage describes how “a collimating optical element, in this case an achromatic doublet lens **902**, may capture the light from source **901**, and project a magnified image of the object near a final focusing lens **905**.” (’582, 44:58-61.) A POSA would have understood that a “magnified image” is not a “collimated beam” because an image requires ray convergence onto an image plane that does not occur with collimated light. (*See* Joint Br. 81; Ilkov ¶¶77-86, 118.) While the specification explains in the FIG. 25 embodiment that a “beam of light propagating between the collimating optical element **902** and the focusing lens **905** may be effectively collimated,” claim 1 requires the collimating optical element to project a collimated beam, not an *effectively* collimated beam, and a POSA would have understood the difference. (Joint Br. 26; Ilkov ¶¶61-64.)

2. ’582, Claim 14

“collimating optical element”	
Parties’ Competing Proposed Functions	<p>Cytek’s Proposed Function: (1) receive light from a light source; and (2) project a collimated beam including a first image onto an optical relay element.</p> <p>BEC’s Proposed Function: (1) receive light from a light source; (2) project a collimated beam including a first image</p>

“collimating optical element”	
Cytek’s Proposed Structure	Indefinite.

Cytek’s proposed function is correct because claim 14 requires an “optical relay element arranged to receive the collimated beam.” But under either parties’ proposal, no corresponding structure exists to perform the second recited function to “project a collimated beam including a first image.” The recited function incorporates two optical concepts that are not coextensive—they are contradictory. (Ilkov¶¶118.) That is, a projected beam is either a “collimated beam” with parallel rays or a “focused beam” with converging rays—a projected beam cannot simultaneously be both by being a “collimated beam including a first image.” Image formation requires focusing light rays for point-to-point correspondence at the image plane—there must be convergence. (Joint Br. 44-47, 51, 81; Ilkov¶¶77-86, 118.) There is no structure that could perform the internally-irreconcilable recited function for the “collimating optical element.” (*Id.*)

3. ’582, Claim 20

“collimating optical element”	
Parties’ Competing Proposed Functions	<p>Cytek’s Proposed Function: (1) receive light from a light source; and (2) project a first image onto an optical relay element.</p> <p>BEC’s Proposed Function: (1) receive light from a light source; (2) project a first image</p>
Cytek’s Proposed Structure	Indefinite.

Cytek’s proposed function is correct because claim 20 requires the “optical relay element [is] configured to receive light from the collimating optical element.” The specification lacks corresponding structure for a collimating optical element that will “project a first image.” Image formation requires light convergence at the image plane (Joint Br. 44-47, 51, 81; Ilkov¶¶77-86, 118), but the patentee admitted during prosecution that a “collimating optical element” does not converge light. (See Joint Br. 36; Ex. 7, 9-10 (“light ‘effectively collimated’ by collimating optical element **902** is not converging” (emphasis added); IlkovSurreply¶17.) Collimating optical element **902** described in the specification is not “clearly linked” to the recited function because, at best, it projects an “effectively collimated” beam when the function of projecting an image requires focusing/converging light.

4. ’106, Claims 1, 13

“collimating optical element”	
Parties’ Competing Proposed Functions	<p>Cytek’s Proposed Function: (1) receive fluorescent light collected by the collecting optical element; and (2) collimate the fluorescent light that is projected onto a first dichroic filter.</p> <p>BEC’s Proposed Function: (1) receive the fluorescent light collected by the collecting optical element; (2) collimate the fluorescent light</p>
Cytek’s Proposed Structure	Indefinite.

Claims 1 and 13 support Cytek’s proposed function, as each require that the

dichroic filter(s) receive collimated light projected from the collimating optical element. Claim 1 recites that a “first curved mirror arranged to receive at least a portion of the fluorescent light after the fluorescent light has passed through the collimating optical element,” indicates that the “portion of the fluorescent light” is collimated. (’106, cl. 1.) That collimated light is reflected by the mirror onto the first dichroic filter. (*Id.*) Similarly, claim 13 recites a “row of mirrors” that “reflect different color bands of the fluorescent light... after the fluorescent light has passed through the collimating optical element” and later that “each of the dichroic filters” is “configured to pass one color band of the fluorescent light reflected by a mirror... and to reflect another color band of the fluorescent light.” (’106, cl. 13.) The functional language in claim 13 makes clear that a first dichroic filter ultimately receives collimated light from the collimating optical element.

No corresponding structure exists that performs the second function for “collimating optical element” in Claims 1 and 13 of the ’106 Patent for the same reasons provided for Claim 1 of the ’582 Patent, incorporated here. (Ilkov¶118.)

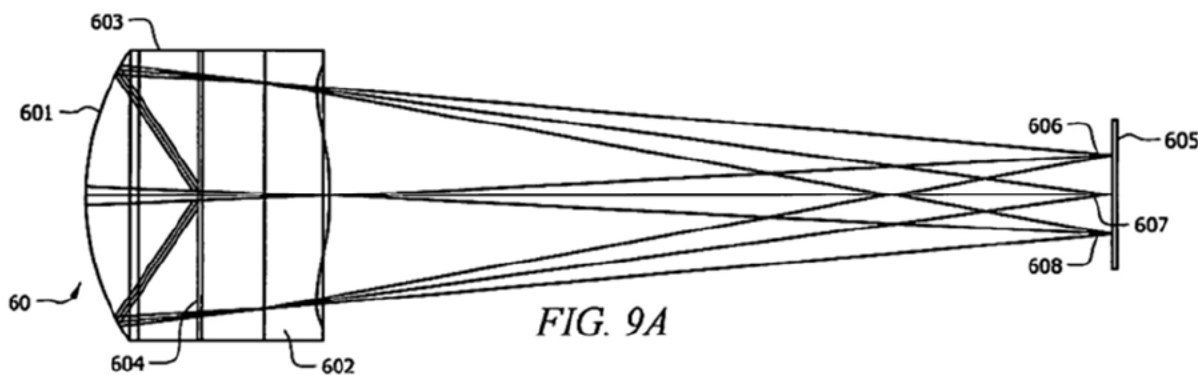
C. “collecting optical element” (’106, Claims 1, 13)

“collecting optical element”	
Parties’ Agreed Upon Function	collect and focus fluorescent light emitted by a particle illuminated by the light source such that the fluorescent light leaving the collecting optical element converges.
Cytek’s Proposed Structure	(1) a concave mirror and an aberration corrector plate attached to the flow cell with

“collecting optical element”	
	<p>the flow cytometer’s viewing zone located between the mirror and the plate; or</p> <p>(2) a concave mirror attached to the flow cell and an aberration corrector plate with the flow cytometer’s viewing zone located between the mirror and the plate; or</p> <p>(3) a concave mirror and an aberration corrector plate attached to the flow cell with the flow cytometer’s viewing zone located between the mirror and the plate and a chromatic compensating doublet lens; or</p> <p>(4) a concave mirror attached to the flow cell and an aberration corrector plate with the flow cytometer’s viewing zone located between the mirror and the plate and a chromatic compensating doublet lens.</p>

Cytek’s proposed construction includes variations of “concave mirror” and “aberration corrector plate” arrangements that are specifically disclosed and clearly linked to performing the claimed function. (*See* ’582, 33:14-42; 34:43-55; FIGs. 8, 8A, 8B, 9A; 35:14-36:56, FIGs. 10, 11, 12, 13.) Every passage in the specification that discloses the structure of the composite microscope objective (the ’106 patent’s “collecting optical element”) includes a “concave mirror” and an “aberration corrector plate” in a particular arrangement—these two components are why it is called a *composite* microscope objective. (*See id.*, 3:7-36; 5:47-65; 6:26-38; 7:57-8:11; 9:10-24; 14:41-54; 15:56-67; 21:51-57; 33:14-42; 34:43-55; 35:14-36:55;

51:45-57.) These structures are clearly linked and necessary to perform the agreed-upon claimed function. For example, FIGs. 8, 8A, 8B, and 9A and their accompanying descriptions show how a “plano-concave back surface mirror **601**” and a “plano aspheric corrector plate **602**” collect and focus fluorescent light emitted by a particle illuminated by the light source such that the fluorescent light leaving the collecting optical element converges.



(See *id.*, 33:14-42; 34:43-55; FIGs. 8, 8A, 8B, 9A; see also 51:45-57; FIG. 36; see also Ilkov ¶¶121-122.)

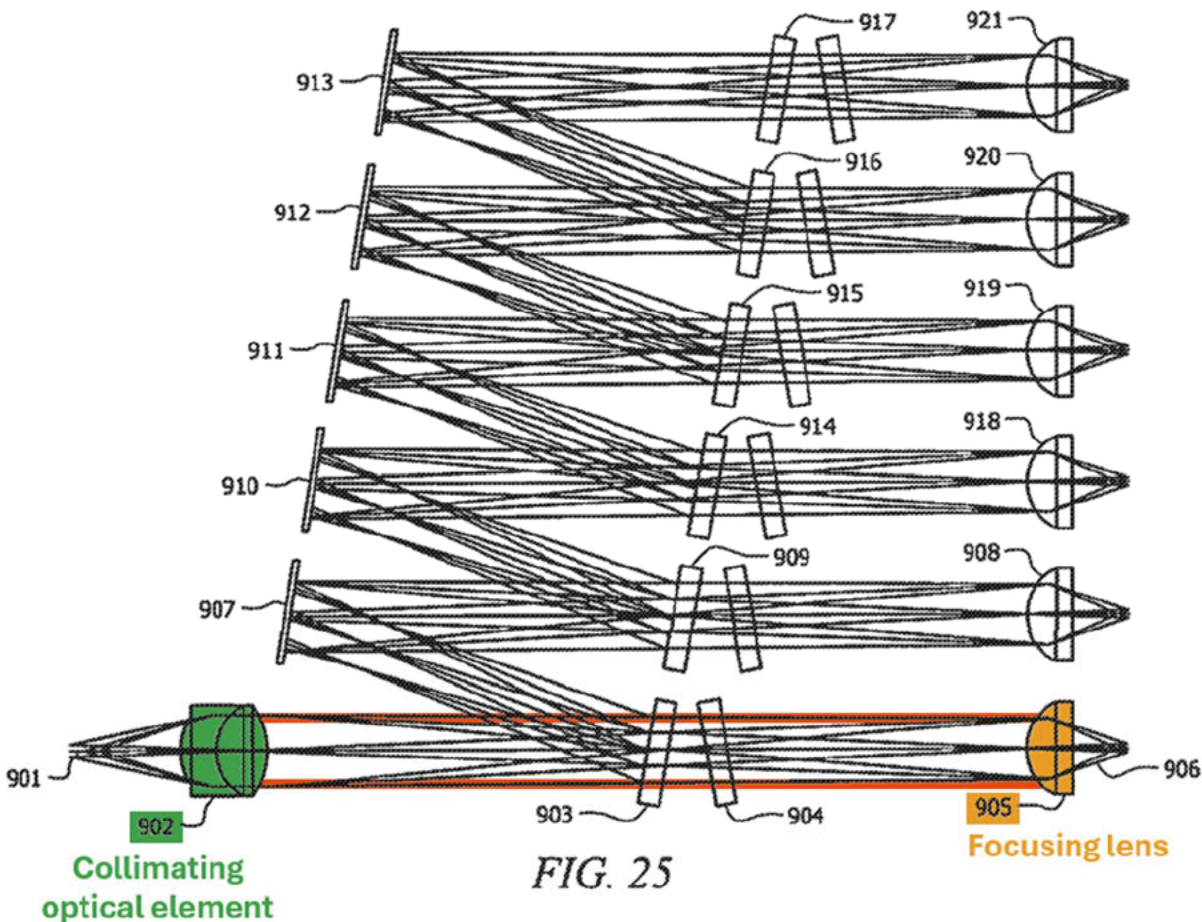
D. “focusing optical element”

1. ’582, Claim 1

“focusing optical element”	
Parties’ Agreed Upon Functions	(1) receive at least a portion of a collimated beam reflected by the optical relay element; and (2) focus the portion of the collimated beam received from the optical relay element onto a semiconductor detector.
Cytek’s Proposed Structure	focusing lens that is of a size that captures all light rays of the at least a portion of a

“focusing optical element”	
	collimated beam

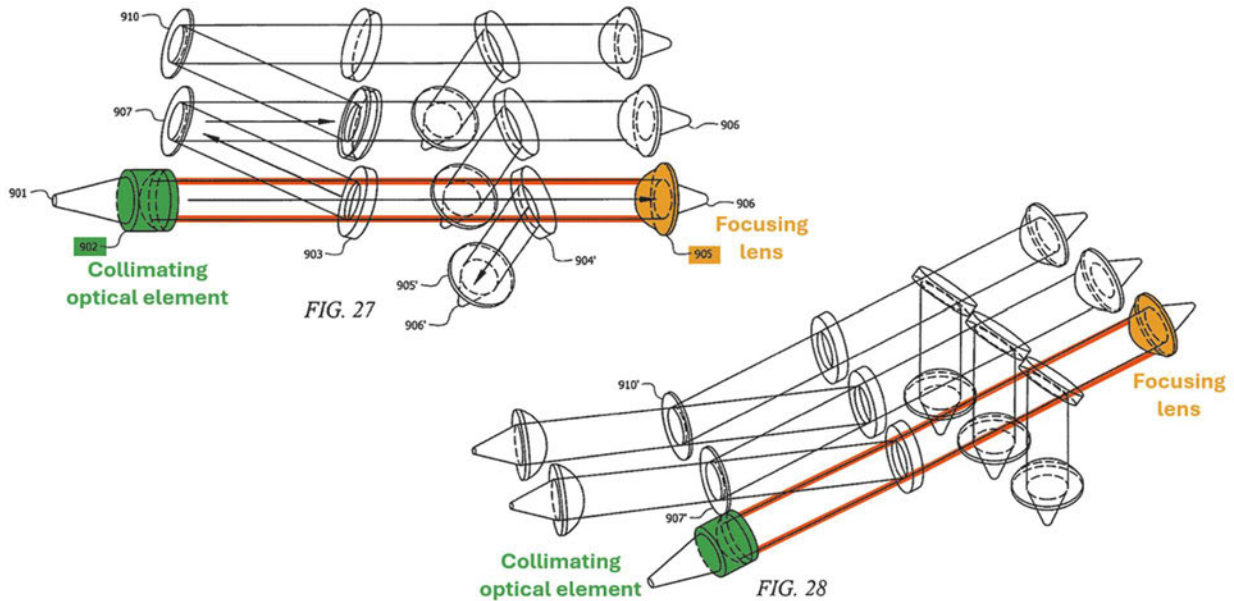
The specification describes a “focusing lens” that performs the claimed functions for “focusing optical element.” (See ’582, 44:58-45:7, 45:38-54, 46:17-27, 47:15-21, FIG. 25, FIG. 25A, FIG. 27, FIG. 28.) FIG. 25 also depicts focusing lens **905** (shown as a plano-convex lens) as comparable in size to collimating optical element **902**.



(’582, FIG. 25 (annotated).) The specification explains that the collimating optical element “project[s] a magnified image of the object near a final focusing lens **905**”

and that “the size of the image near **905** may be kept approximately the same as the effective size of the collimating optical element **902**.” (*Id.*, 44:60-63.)

FIGs. 27 and 28 similarly show a collimating optical element of equivalent diameter to focusing lenses in the WDM.



(’582, FIGs. 27, 28 (annotated); *see also* Ilkov¶133.)

Claim 1’s recited functions for “focusing optical element” also require the focusing lens be “of a size that captures all light rays of the at least a portion of a collimated beam.” Claim 1 recites a “collimating optical element configured to project a collimated beam” and an “optical relay element arranged to receive at least a portion of the collimated beam from the collimating optical element” and then “reflect the portion of the collimated beam.” (’582, cl. 1.) The recited “portion” retains substantially the same beam size as the “collimated beam,” as the

specification only supports separating a collimated beam into distinct color bands (i.e., *wavelength division* demultiplexing) while maintaining substantially the same beam size throughout the relay architecture. (*See* '582, 9:51-65, 20:18-33, 20:40-44, 20:62-21:11, 44:58-63, 44:66-45:7, 45:22-31, 45:49-54, 47:18-21; FIGs. 25, 27, 28. *See* Joint Br. 123-25, 127-28 (“portion” of light refers to a “subset of the spectrum of wavelengths of light within a defined beam”).) The “first focusing optical element” then receives “a portion of the collimated beam” from the optical relay element—still substantially the same beam size as when projected from the collimating optical element—and then will “focus the portion of the collimated beam received from the optical relay element onto the first semiconductor detector.” ('582, cl. 1.) With a collimated beam that maintains beam size “without significantly expanding” over a given distance, the focusing optical element can only perform its function as claimed if its lens diameter is at or greater than the diameter of a collimating optical element in the WDM. (Ilkov¶132.)

2. '582, Claim 17

“focusing optical element”	
Parties’ Agreed Upon Functions	(1) receive the collimated beam from the optical relay element at the extended collimated distance; and (2) focus the collimated beam onto a first semiconductor detector.
Cytek’s Proposed Structure	Indefinite.

Claim 17 is indefinite because a POSA would not have understood what

structure could perform the ambiguous function of “receiv[ing] the collimated beam ... at the extended collimated distance.” The specification fails to quantify a “collimated distance” for a collimated beam, a problematic omission where that collimated beam originally projected from an extended light source includes some divergence. (Ilkov¶¶39-41.) A POSA would be unable to discern where a light beam from an extended light source transitions from being collimated to de-focused (e.g., a “collimated distance”). (Ilkov¶64.) The same indefiniteness issue infects the term “extended collimated distance,” for which the specification provides no guideposts for a POSA to discern what is a collimated distance versus not. Understanding where a “focusing optical element” is placed is critical to determine the type of lens to be used. (Ilkov¶¶ 108, 114, 125, 137; Ex. 90, IlkovSurreply¶64.) A lens placed at one location may focus light but at another location may collimate it.

3. '582, Claim 26

“focusing optical element”	
Parties’ Agreed Upon Function	focus the light from the optical relay element to a size smaller than the object of the light source onto a semiconductor detector
Cytek’s Proposed Structure	focusing lens that is of a size that captures all light rays of the at least a portion of a collimated beam

The reasoning for Cytek’s proposed structure for “focusing optical element”

in Claim 26 of the '582 Patent is the same as for Claim 1 of the '582 Patent, incorporated here. Claim 26 requires that the “focusing optical element” be “configured to focus the light from the optical relay element.” ('582, cl. 26.) The specification only supports a WDM where the light received from the optical relay element is of substantially the same beam size as the light projected by the collimating optical element. Thus, to focus *the* light requires that the “focusing optical element” have a diameter at or greater than the collimating optical element.

4. '106, Claim 14

“focusing optical element”	
Parties’ Agreed Upon Function	focus the band of fluorescent light passing through a dichroic filter in the row of dichroic filters onto a corresponding semiconductor detector
Cytek’s Proposed Structure	focusing lens that is of a size that captures all light rays of the band of fluorescent light passing through a dichroic filter

The reasoning for Cytek’s proposed structure for “focusing optical element” in Claim 14 of the '106 Patent is the same as for Claim 1 of the '582 Patent, incorporated here. Claim 14 recites that each “focusing optical element” must “focus the band of fluorescent light passing through a dichroic filter,” not a spatial segment of that light. ('106, cl. 14.) Because the “collimating optical element” is “configured to collimate the fluorescent light” resulting in a collimated beam traveling through the WDM’s relay architecture, the recited function can only be

accomplished where the “focusing optical element” has a diameter at or greater than that of the “collimating optical element.”

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Respectfully submitted,

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WORD COUNT CERTIFICATION

Pursuant to the Court's Standing Order Regarding Briefing in All Cases (D.I. 7), the undersigned counsel hereby certifies that Defendant Cytex Biosciences, Inc.'s Supplemental Claim Construction Brief contains 5,321 words, which was counted by using the word count feature in Microsoft Word, in 14-point Times New Roman font.

/s/ Jeremy A. Tigan

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CERTIFICATE OF SERVICE

I hereby certify that on September 10, 2025, I caused the foregoing to be electronically filed with the Clerk of the Court using CM/ECF, which will send notification of such filing to all registered participants.

I further certify that I caused copies of the foregoing document to be served on September 10, 2025, upon the following in the manner indicated:

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